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File Rocket Leaflet

50X1

PROGRESS REPORT

FOR

DECEMBER 1955

ON

4-INCH ROCKET

ORIGINAL CL BY 235579
☐ DECL ☒ REVW ON 2010
EXT BYND G YRS BY 5 AME
REASON 3 d (3)

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JUST <u>22</u>	NEXT REV <u>2010</u>	AUTH: NR 70-2

1210-E-1

January 20, 1956

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Progress for the month of December concerned studies of the causes of structural failures in previous tests. Several experimental materials were tested statically.

A static test was made on a motor made with a Celeron head and one made with a glass fiber polyester head with a central reinforced core. Both tests were successful, the latter demonstrating the advantage of a central convolute reinforced core at the region of most stress. Another standard motor, with a Kn high enough to result in a 100% increase operating pressure, over normal pressure, failed due to center blowout.

Carbon was used as a possible nozzle material with complete success. This material could be molded in finished form and would eliminate the assembly which is now required.

Since previous flights were unstable, the cant angle of the nozzle was increased from 15° to 20° so as to increase the stability factor. Two models were made incorporating this change but did not fly correctly. It was thought that this difficulty was caused by insufficient increase in the stability factor. Since a nozzle cant angle greater than 20° is impractical, the tubes were also canted at 4° . This results in an effective nozzle cant of 24° and also an increased nozzle radius from center. This design should result in a stability factor of 150% of the theoretical minimum. Upon testing, these models were much more stable but were still insufficiently so, so as to provide a correct flight path. In a general discussion with all concerned, it was felt that the passageway in the head for equalization of pressures was too small and that this unequalization of pressure between the tubes could result in an instability during the propellant burning portion of the flight. A modification of the head design to increase the gas channel area should result in increased flight stability.

Future Plans

The changes in design discussed above will be incorporated into new models and tested both statically and in flight. New head materials with a central reinforced core will be static tested and, if successful, will be made into flight models. Work will progress on the problems involved in payload ejection.

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Financial Statement

Total amount of Contract (Phases 1 & 2)

Obligations for December

Total Obligations to December 31, 1955

Balance of Contract

Apparent low expenditure is due to adjustments in the total funded cost figures for November and December on accrual basis.

Expiration Date - February 1, 1956

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